

1 **Amendment to the Claims**

2 **In the Claims:**

3 Please amend Claims 1, 10, 13, and 18 as follows:

4 1. (Currently Amended) An impeller configured to function as a combined fan and impact
5 collector, comprising a base plate and a plurality of vanes disposed on an upper surface of the base
6 plate, such that a ratio of vane height to base plate diameter is in the range of about 0.01 to about 0.2,
7 each vane curving between a first end that is disposed generally adjacent to an outer edge of the base
8 plate, and a second end that is disposed inwardly, substantially closer to a center of the base plate.

9 2. (Withdrawn)

10 3. (Withdrawn)

11 4. (Withdrawn)

12 5. (Withdrawn)

13 6. (Withdrawn)

14 7. (Withdrawn)

15 8. (Withdrawn)

16 9. (Original) An impact particle collector for separating particulates from a gaseous fluid in
17 which the particulates are entrained, comprising:

18 (a) a prime mover having a drive shaft that is drivingly rotated;

19 (b) an impeller that is mechanically coupled to the drive shaft and rotated thereby,
20 the impeller comprising a base plate and a plurality of vanes disposed on an upper surface of the base
21 plate, such that a ratio of vane height to base plate diameter is in the range of about 0.01 to about 0.2;
22 and

23 (c) a housing for the impeller, said housing defining a fluid passage for conveying
24 the gaseous fluid in which the particulates are entrained to the impeller, such that when the impeller
25 is rotated by the prime mover, the gaseous fluid is drawn into the housing so that the particulates
26 entrained in the gaseous fluid impact upon the impeller, being thereby separated from the gaseous
27 fluid when impacted by the vanes of the impeller.

28 10. (Currently Amended) The impact particle collector of Claim 9, ~~wherein the plurality of~~
29 ~~vanes are configured to include an enlarged base to facilitate injection molding wherein a base of~~

1 each of the plurality of vanes extends laterally to a greater extent than does an upper surface of each
2 vane.

3 11. (Original) The impact particle collector of Claim 9, wherein the plurality of vanes are
4 configured such that a height of each vane adjacent a center of the base plate is larger than a height of
5 each vane adjacent to an outer edge of the base plate.

6 12. (Original) The impact particle collector of Claim 9, wherein the plurality of vanes are
7 configured such that each vane does not extend within about one millimeter of an outer edge of the
8 base plate.

9 13. (Currently Amended) The impact particle collector of Claim 9, ~~wherein the plurality of~~
10 ~~vanes are configured to reduce a formation of a vortex within the housing wherein the plurality of~~
11 ~~vanes are substantially evenly spaced upon the upper surface of the base plate, such that when the~~
12 ~~impeller is drivingly rotated by the prime mover, the impeller presents a balanced load.~~

13 14. (Original) The impact particle collector of Claim 13, wherein at least some of the
14 plurality of vanes are truncated vanes.

15 15. (Original) The impact particle collector of Claim 13, wherein the housing includes an
16 opening disposed proximate a center of the base plate, and none of the vanes are disposed on a
17 portion of the base plate directly beneath the opening.

18 16. (Original) The impact particle collector of Claim 9, further comprising a nozzle in fluid
19 communication with a rinse fluid reservoir, the nozzle being disposed to introduce a rinse fluid at the
20 inward edges of the plurality of vanes, when the impeller is being rotated by the prime mover.

21 17. (Original) The impact particle collector of Claim 9, further comprising:

22 (a) a rinse fluid reservoir including a sensor configured to detect a level of rinse
23 fluid contained within the reservoir;

24 (b) a nozzle in fluid communication with the rinse fluid reservoir, the nozzle being
25 disposed to introduce a rinse fluid into the housing to rinse particulates off of the impeller; and

26 (c) a pump configured to deliver a rinse fluid from the rinse fluid reservoir to the
27 nozzle.

28 18. (Currently Amended) The impact particle collector of ~~Claim 14~~ ~~Claim 17~~, further
29 comprising a microcontroller electrically coupled with the sensor, and controllably coupled to the

1 prime mover and the pump, the microcontroller being configured to implement a plurality of
2 functions, including at least one of:

3 (a) reducing a rotational velocity of the impeller whenever a level of rinse fluid in
4 the rinse fluid reservoir falls below a predetermined level;

5 (b) reducing a volume of fluid delivered from the rinse fluid reservoir to the nozzle
6 per unit time, whenever a level of rinse fluid in the rinse fluid reservoir falls below a predetermined
7 level; and

8 (c) de-energizing the prime mover whenever a level of rinse fluid in the rinse fluid
9 reservoir falls below a predetermined level.

10 19. (Original) The impact particle collector of Claim 18, further comprising a makeup
11 reservoir in fluid communication with the rinse fluid reservoir, the makeup reservoir providing
12 additional rinse fluid to the rinse fluid reservoir should level of rinse fluid in the rinse fluid reservoir
13 falls below a predetermined level.

14 20. (Original) The impact particle collector of Claim 18, wherein the rinse fluid reservoir is
15 coupled in fluid communication with a lower portion of the housing, and said lower portion of the
16 housing includes sloping surfaces configured to direct rinse fluid contacting the lower portion of the
17 housing into the rinse fluid reservoir.

18 21. (Original) The impact particle collector of Claim 9, further comprising a filter configured
19 to filter the gaseous fluid before the gaseous fluid contacts the impeller.

20 22. (Original) The impact particle collector of Claim 21, wherein the filter comprises a size-
21 exclusion membrane including pores of a predetermined certain size, such that particles larger than
22 the pores cannot pass through the membrane.

23 23. (Original) The impact particle collector of Claim 21, wherein the filter comprises a magnetic
24 membrane including pores of a predetermined certain size, such that nonmagnetic particles
25 larger than the pores cannot pass through the membrane, and magnetic particles smaller than the
26 pores cannot pass through the membrane.

27 24. (Original) The impact particle collector of Claim 21, wherein the filter comprises an
28 affinity-based membrane including pores of a predetermined certain size, such that particles larger
29 than the pores cannot pass through the membrane, and particles smaller than the pores and having a
30 corresponding affinity cannot pass through the membrane.

1 25. (Original) The impact particle collector of Claim 24, wherein the affinity-based
2 membrane comprises an antibody coating, such that particles having a corresponding antigen cannot
3 pass through the membrane.

4 26. (Original) The impact particle collector of Claim 21, wherein the filter comprises a
5 membrane including pores of a predetermined certain size, and a incorporating a chemical adsorbent,
6 such that particles larger than the pores cannot pass through the membrane, and chemicals absorbed
7 by the chemical adsorbent cannot pass through the membrane.

8 27. (Original) The impact particle collector of Claim 9, wherein the impeller has a mean
9 surface roughness selected to increase the likelihood that a particle entrained in the gaseous fluid will
10 adhere to the impeller.

11 28. (Original) The impact particle collector of Claim 9, wherein the internal surfaces of the
12 housing each have a mean surface roughness selected to decrease the likelihood that a particle
13 entrained in the gaseous fluid will adhere to the internal surfaces of the housing.

14 29. (Original) The impact particle collector of Claim 9, wherein the housing comprises
15 curved internal surfaces wherever a side of the housing joins an upper portion of the housing, and
16 wherever a side of the housing joins a lower portion of the housing, such curved internal surfaces
17 reducing the likelihood that a rinse fluid will be undesirably retained within the housing.

18 30. (Original) The impact particle collector of Claim 9, wherein an upper portion of the
19 housing comprises an opening for directing a gaseous fluid toward the impeller, and an external
20 surface of the upper portion of the housing is shaped as an inverted cone, with a base of the cone
21 corresponding to an outer edge of the upper portion, and an apex of the cone corresponding to the
22 opening, such that the apex of the cone is disposed lower than the base of the cone.

23 31. (Original) The impact particle collector of Claim 9, wherein an upper portion of the
24 housing comprises an opening for directing a gaseous fluid toward the impeller, and an internal
25 surface of the upper portion of the housing is shaped as an inverted cone, with a base of the cone
26 corresponding to an inner edge of the upper portion, and an apex of the cone corresponding to the
27 opening, such that the apex of the cone is disposed higher than the base of the cone.

28 32. (Original) The impact particle collector of Claim 9, wherein an upper portion of the
29 housing comprises an opening for directing a gaseous fluid toward the impeller, and an external
30 surface of the upper portion of the housing slopes away from the opening, such that a highest portion

1 of the external surface of the upper portion of the housing corresponds to an outer edge of the upper
2 portion, and a lowest portion of the external surface of the upper portion of the housing corresponds
3 to a periphery of the opening.

4 33. (Original) The impact particle collector of Claim 9, wherein an upper portion of the
5 housing comprises an opening for directing a gaseous fluid toward the impeller, and an internal
6 surface of the upper portion of the housing slopes away from the opening, such that a lowest portion
7 of the internal surface of the upper portion of the housing corresponds to an inner edge of the upper
8 portion, and a highest portion of the internal surface of the upper portion of the housing corresponds
9 to a periphery of the opening.

10 34. (Original) The impact particle collector of Claim 33, wherein each of the plurality of
11 vanes includes a sloping upper surface substantially corresponding to the slope of the internal surface
12 of the upper portion of the housing, such that a height of each vane is greater proximate a center of
13 the base plate than a height of each vane proximate an outer edge of the base plate.

14 35. (Original) The impact particle collector of Claim 33, wherein the impeller further
15 comprises a top plate having an opening in a center of the top plate, the top plate having sloping
16 upper surfaces and lower surfaces that substantially correspond to the slope of the internal surface of
17 the upper portion of the housing, such that a lowest portion of the top plate corresponds to an outer
18 edge of the top plate, and a highest portion of the top plate corresponds to an inner edge of the top
19 plate proximate the opening in the top plate.

20 36. (Original) The impact particle collector of Claim 9, wherein a gap exists between an
21 inner surface of an upper portion of the housing and the impeller, such that the gap is designed to
22 exceed an expected dimensional variation related to a manufacturing process used to produce the
23 impeller.

24 37. (Original) The impact particle collector of Claim 36, wherein the gap is about 2
25 millimeters.

26 38. (Original) The impact particle collector of Claim 36, wherein the gap is about 2.2
27 millimeters.

28 Claims 39-55 (Withdrawn)

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